

## WHAT IS CLAIMED IS:

- 5
1. A method comprising positively displacing a first luminescence material precursor from a dispenser to a first position of an array, displacing a second luminescence material precursor from a dispenser mechanism to a second position of an array and simultaneously reacting said first and second precursors to produce a library of candidate luminescence materials.
- 10
2. The method of claim 1, wherein reacting said first and second precursors comprises effecting parallel chemical synthesis of an array of said precursors.
- 15
3. The method of claim 1, comprising mechanically positively displacing said first precursor from said dispenser.
4. The method of claim 1, comprising mechanically positively displacing said first precursor from said dispenser with a syringe.
- 20
5. The method of claim 1, comprising displacing said first and second precursors from respective hollow barrels by activating a plunger within each of said barrels.
6. The method of claim 1, comprising first loading said precursors into said dispenser.
7. The method of claim 1, wherein said precursor is displaced within a linear dynamic range of from about 4 nano-liter to about 250 micro-liter.
8. The method of claim 1, wherein said precursor is displaced within a linear dynamic range of from about 20 nano-liter to about 100 micro-liter.
9. The method of claim 1, wherein said precursor is displaced within a linear dynamic range of from about 100 nano-liter to about 50 micro-liter.
- 25
10. The method of claim 1, comprising first aspirating a said precursor into said dispenser.

11. The method of claim 10, wherein said precursor is aspirated into said dispenser within a linear dynamic range of from about 4 nano-liter to about 250 micro-liter.

5 12. The method of claim 10, wherein said precursor is aspirated into said dispenser within a linear dynamic range of from about 20 nano-liter to about 100 micro-liter.

13. The method of claim 10, wherein said precursor is aspirated into said dispenser within a linear dynamic range of from about 100 nano-liter to about 50 micro-liter.

10 14. The method of claim 1, comprising first aspirating a plurality of precursors into respective dispensers of a battery of dispensers.

15 15. The method of claim 1, comprising first aspirating said precursors into respective hollow barrels of a battery of said dispensers, positioning respective wells of an array plate beneath each of said barrels and displacing each of said precursors from respective hollow barrels by activating a plunger within each of said barrels.

20 16. The method of claim 1, comprising first robotically positioning respective vials containing said precursors beneath a battery of said dispensers, aspirating said precursors into respective hollow barrels of said battery of said dispensers, positioning respective wells of an array plate beneath each of said barrels and displacing each of said precursors from respective hollow barrels by activating a plunger within each of said barrels.

25 17. The method of claim 1, comprising first robotically positioning respective vials containing said precursors beneath a battery of said dispensers, aspirating said precursors into respective hollow barrels of said battery of said dispensers, robotically positioning respective wells of an array plate beneath each of said barrels and displacing each of said precursors from respective hollow barrels by activating a plunger within each of said barrels.

30 18. The method of claim 17, comprising controlling positioning of said vials with a microprocessor.

19. The method of claim 17, comprising controlling positioning of said vials and positioning of wells of said array plate with a microprocessor.

20. The method of claim 1, wherein said precursors are highly viscous materials.

21. The method of claim 1, wherein said precursors are highly viscous materials.

22. The method of claim 1, wherein said precursors have a viscosity of greater than about 1 centipoise.

23. The method of claim 1, wherein said precursors have a viscosity of greater than about 1 centipoise to about 100 centipoise.

24. The method of claim 1, wherein said precursors comprise a solid in fluid suspension of a particle size of up to about 50 $\mu$ m.

25. A combinatorial high throughput screening (CHTS) method for selecting a luminescence material, comprising:

(A) (i) aspirating a candidate luminescence material precursor into a hollow tube by action of a plunger; (ii) dispensing said precursor into a well of an array plate by a positive displacement action of said plunger against said precursor; (iii) effecting a reaction of said precursor to form a candidate luminescence material; and (iv) evaluating said candidate luminescence material.

26. The method of claim 25, further comprising (B) reiterating (A) wherein a successive candidate luminescence material precursor for a step (i) is selected as a result of an evaluating step (iii) of a preceding iteration of (A).

27. A combinatorial high throughput screening liquid dispensing assembly comprising a battery of positive displacement driven dispensers for dispensing solutions of precursor luminescence materials, an array plate with wells to receive dispensed solution from said dispenser, a robotic positioning table supporting said array plate to position wells beneath respective dispensers and a controller to control dispensing of said solutions and positioning of said plate.

28. The assembly of claim 27, additionally comprising a plurality of reservoirs of solution for delivery of solution to said battery of dispensers.

29. The assembly of claim 28, wherein said plurality of reservoirs is robotically positionable for aspiration of solution into respective dispensers of said battery.

30. The assembly of claim 27, wherein a tip to tip separation of said dispensers is registered with a well to well separation of said plate.

31. The assembly of claim 27, wherein said positive displacement dispensers have a capability of displacing solution within a linear dynamic range of from about 4 nano-liter to about 250 micro-liter.

32. The assembly of claim 27, wherein said positive displacement dispensers have a capability of displacing solution within a linear dynamic range of from about 20 nano-liter to about 100 micro-liter.

33. The assembly of claim 27, wherein said positive displacement dispensers have a capability of displacing solution within a linear dynamic range of from about 100 nano-liter to about 50 micro-liter.

34. A combinatorial high throughput screening system, comprising the dispensing assembly of claim 27, a furnace to heat treat solutions of precursor luminescence materials in said wells and an evaluator to evaluate luminescence materials from said precursors.